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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
			EXAMINER DHINGRA, RAKESH KUMAR	
			ART UNIT 1763	PAPER NUMBER

DATE MAILED: 06/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

CW

<b>Office Action Summary</b>	Application No. 10/813,119	Applicant(s) O'MEARA ET AL.	
	Examiner Rakesh K. Dhingra	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 April 2006.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) 10-15, 18-28, 32-38, 40& 42-44 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-9, 16, 17, 29-31, 39, 41 and 45 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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***Election/Restrictions***

Applicant's election with traverse of group I, species 1 (claims 1-9, 16, 17, 29-31, 39-45) in the reply filed on 4/24/06 is acknowledged. The traversal is on the ground(s) that a search and examination of the entire application would not place a serious burden on the Examiner. This is not found persuasive because as explained in previous office action the special technical features of inventions of groups I and II as well as those species 1-8 are mutually exclusive and therefore search required for elected group I and the elected species I will not necessarily be co-extensive with the special technical features of non-elected invention and the species. Further, search required for elected and non-elected invention and species would be burdensome. Accordingly claims 10-15, 18-28 and 32-38 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species. Additionally, claims 40, 42-44 have also been withdrawn since these pertain to non-elected group (group II).

The requirement is still deemed proper and is therefore made FINAL.

***Drawings***

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

- 1) Figures 10A – 10C: Reference numbers 1015, 1025, 1025 (carbon wire heaters) are not shown in the drawing, though mentioned in paragraph 00157, line 1 of specification.
- 2) Figures 14A – 14C: Reference number 1420 (second heating assembly) is not shown in the drawing, though mentioned in paragraph 00199, line 1 of specification.

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Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

The disclosure is objected to because of the following informalities:

- 1) Paragraph 00163, line 3 – it is suggested to verify the reference numbers 1013A, 1013A, 1023A, 1023B, 1033A, 1033B) since these do not match with similar reference numbers for transitional elements in other drawings (Figure 5).
- 2) paragraph 00181, line 1- reference numbers for wafers (1140A, 1140B) do not match with Figure 11 where the wafer reference numbers are indicated as 113A, 1130B.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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Claim 45 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 45 recites in part "alternate cooling loops" which is not disclosed in the specification. For the purpose of examination on merits this limitation has been interpreted as "cooling mechanism".

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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**Claim 1-9, 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi (US Patent No. 6,106,628) in view of Toya et al (US PG PUB No. 20012/0162835).**

Regarding Claim 1: Takahashi teach an apparatus (Figure 1) that includes a wafer heating assembly comprising:

a base (holding device) B with susceptors 8, 9 and having a plurality of grooves (recesses) 14, the base (holding device) having turntables (wafer supports) 2, 3 configured to support a wafer 1;

a plurality of heating units 4, 5 disposed in respective grooves (recesses) 14 wherein at least one heating unit comprises heater 13;

rotary shafts 6, 7 to which turn-tables are attached on a common axis of rotation C.

Takahashi further teach that heaters 13 are resistive heaters and are enclosed by quartz cover plate 16. Takahashi also teaches that entire assembly is assembled (mounted) in a CVD chamber {would require a mounting assy – not illustrated} (column 2, line 15 to column 3, line 5).

Takahashi does not teach that each heater unit comprises:

a tube having a carbon wire heater comprising a carbon fiber bundle and sealed within the tube, each tube being mounted in a recess in the holding device, and a connecting terminal coupled to opposing ends of the carbon wire heater.

Toya et al teach an apparatus (Figures 1, 2A, 2B) that includes a heater assembly comprising of:

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a quartz tube 4 having a carbon wire heater 2 comprising a carbon fiber bundle and sealed within the tube, and a sealed (connecting) terminal 10 coupled to opposing ends of the carbon wire heater 2 (paragraphs 0069 – 0077, 0097).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to replace resistive heater disposed in grooves (recesses) in Takahashi's apparatus with carbon fiber wire heaters enclosed in quartz tube as taught by Toya et al in the apparatus of Takahashi to achieve more flexibility and durability of heating elements and heating uniformity (paragraph 0085).

Regarding Claims 2-9: Toya et al teach that quartz tube 4 is substantially straight tube (Figure 1). Further, it would be obvious to change shape of heating element with its tube (and therefore shape of groove) as per shape of substrate to maintain uniformity of temperature and obtain desired temperature profiles.

In this regard courts have ruled:

*“ Regarding change in shape: It was held in re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) that the shape was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular shape was significant. (Also see MPEP 2144.04(d)).”*

Regarding Claim 39: It would be obvious to duplicate the wafer heating assembly (including holding device with corresponding heating units) to increase through-put during wafer processing.

In this connection it has been ruled by courts (Case law):

*“Duplication of parts was held to have been obvious. St. Regis Paper Co. v. Beemis Co. Inc. 193 USPQ 8, 11 (1977); In re Harza 124 USPQ 378 (CCPA 1960).”*

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**Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi (US Patent No. 6,106,628) in view of Toya et al (US PG PUB No. 20012/0162835) as applied to claim 1 and further in view of Turner et al (US Patent No. 6,688,375).**

Regarding Claim 16: Takahashi in view of Toya et al teach all limitations of the claim except thermal barrier and cooling unit in the wafer heating assembly.

Turner et al teach an apparatus (Figure 3A) that includes a cassette (substrate holder) 30 for holding substrate S and having a heating section 32 and a heat shield (thermal barrier) 36 coupled to substrate holder and which isolates the heating section 32 from a cooling section 34 (column 5, line 50 to column 6, line 15).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a thermal barrier and a cooling unit in the substrate holder as taught by Turner et al in the apparatus of Takahashi in view of Toya et al enable isolate heating and cooling sections.

**Claim 17, 29-31, 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi (US Patent No. 6,106,628) in view of Toya et al (US PG PUB No. 20012/0162835) as applied to claim 1 and further in view of Szekeresch et al (US Patent No. 6,919,538).**

Regarding Claim 17: Takahashi in view of Toya et al teach all limitations of the claim except temperature sensor coupled to substrate holder.

Szekeresch et al teach an apparatus (Figure 1) that includes a base plate (substrate holder) 3 for holding substrate S and having grooves 7 that help divide the underside of plate 3 into plurality of square shaped heating elements 10 and where each heating



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element (that is substrate holder) is provided with temperature sensors (not shown in figure) (column 4, lines 10-50).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a temperature sensors with holding device as taught by Szekeresch et al in the apparatus of Takahashi in view of Toya et al to enable monitor the temperature of holding device.

Regarding Claim 29: Takahashi teach turn-tables 2, 3 (like cover) coupled to the base (holding device) B {Figure 1}.

Regarding Claims 30, 31: Takahashi in view of Szekeresch et al teach a plurality of substrate holding means (not shown in figure) for holding substrate 12 (Szekeresch et al – Figure 1 and column 4, lines 55-65). Further it is known in art to use a temperature sensor as one of the substrate supporting pins (raised portion).

Regarding Claim 41: Takahashi et al in view of Toya et al teach all limitations of the claim including susceptors 8 for supporting a substrate 1 (Takahashi – Figure 1) and means to independently heat different regions of wafer 12 using PID regulator 26 and process control mechanism 24 (Szekeresch et al – column 5, lines 15-25) and means to mount the heating assembly in the process chamber (not shown in Figure 1) {Takahashi – column 2, lines 15-25}.

**Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi (US Patent No. 6,106,628) in view of Toya et al (US PG PUB No. 20012/0162835) as applied to claim 1 and further in view of Schaper et al (US Patent No. 6,353,209).**

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Regarding Claim 45: Takahashi in view of Toya et al teach all limitations of the claim except cooling mechanism (alternate cooling loops) corresponding to carbon wire heating elements to increase speed of thermal response and configured to flow gas or other coolant fluid.

Schaper et al teach an apparatus (Figure 4A, 7A-C) that includes a thermal processing module 50 for temperature control of substrate 10 and includes heating elements 56 whose temperature can be independently controlled and further includes a cooling plate (cooling mechanism) 62 that helps to cool or control the ramp rate of individual heating elements [column 3, line 20 to column 4, line 10 and column 5, line 5 to column 6, line 55).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to provide cooling mechanism (alternate cooling loops) as taught by Schaper et al in the apparatus of Takahashi in view of Toya et al to achieve desired temperature profiles during substrate processing.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Rakesh Dhingra



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Art Unit 1763